

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

PETRÉ, D.
Albihns Patentbyrå Stockholm AB
P.O. Box 5581
S-114 85 Stockholm
SUÈDE

Date of mailing (day/month/year)

19 April 2001 (19.04.01)

Applicant's or agent's file reference

56930-62060

International application No.

PCT/SE00/01927

IMPORTANT NOTIFICATION

International filing date (day/month/year)

05 October 2000 (05.10.00)

1. The following indications appeared on record concerning:

☒

the applicant

☐

the inventor

☐

the agent

☐

the common representative

Name and Address

INTERNORDISK SPÄNNARMERING AB
S-169 83 Stockholm
Sweden

State of Nationality

SE

State of Residence

SE

Telephone No.

Facsimile No.

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒

the person

☐

the name

☐

the address

☒

the nationality

☒

the residence

Name and Address

VSL INTERNATIONAL AG
Bernstrasse 9
CH-3421 Lyssach
Switzerland

State of Nationality

CH

State of Residence

CH

Telephone No.

Facsimile No.

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒

the receiving Office

☐

the International Searching Authority

☐

the International Preliminary Examining Authority

☒

the designated Offices concerned

☐

the elected Offices concerned

☐

other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Jean-Marie McAdams

Telephone No.: (41-22) 338.83.38

BEST AVAILABLE COPY

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

BOVARD LTD.
Optingenstrasse 16
CH-3000 Berne 25
SUISSE

Date of mailing (day/month/year)

25 September 2001 (25.09.01)

Applicant's or agent's file reference

56930-62060

IMPORTANT NOTIFICATION

International application No.

PCT/SE00/01927

International filing date (day/month/year)

05 October 2000 (05.10.00)

1. The following indications appeared on record concerning:

☐

the applicant

☐

the inventor

☒

the agent

☐

the common representative

Name and Address

PETRE, D
Albihns Patenbyra Stockholm AB
P.O. Box 5581
S-114 85 Stockholm Suède

State of Nationality

State of Residence

Telephone No.

+41-31-335.20.00

Facsimile No.

+41-31-332.81.59

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒

the person

☐

the name

☐

the address

☐

the nationality

☐

the residence

Name and Address

BOVARD LTD.
Optingenstrasse 16
CH-3000 Berne 25
Switzerland

State of Nationality

State of Residence

Telephone No.

+41-31-335.20.00

Facsimile No.

+41-31-332.81.59

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒

the receiving Office

☐

the International Searching Authority

☐

the International Preliminary Examining Authority

☐

the designated Offices concerned

☒

the elected Offices concerned

☐

other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Catherine MASSETTI

Telephone No.: (41-22) 338.83.38

PCT

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

BOVARD LTD.
Optingenstrasse 16
CH-3000 Bern 25
SUISSE

Date of mailing (day/month/year) 06 février 2002 (06.02.02)	
Applicant's or agent's file reference 56930-62060	IMPORTANT NOTIFICATION
International application No. PCT/SE00/01927	International filing date (day/month/year) 05 octobre 2000 (05.10.00)

1. The following indications appeared on record concerning: <input checked="" type="checkbox"/> the applicant <input type="checkbox"/> the inventor <input type="checkbox"/> the agent <input type="checkbox"/> the common representative		
Name and Address VSL INTERNATIONAL AG Bernstrasse 9 CH-3421 Lyssach Switzerland	State of Nationality CH	State of Residence CH
Telephone No.		
Facsimile No.		
Teleprinter No.		
2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning: <input type="checkbox"/> the person <input type="checkbox"/> the name <input checked="" type="checkbox"/> the address <input type="checkbox"/> the nationality <input type="checkbox"/> the residence		
Name and Address VSL INTERNATIONAL AG Scheibenstrasse 70 CH-3014 Berne Switzerland	State of Nationality CH	State of Residence CH
Telephone No.		
Facsimile No.		
Teleprinter No.		
3. Further observations, if necessary:		
4. A copy of this notification has been sent to: <div style="display: flex; justify-content: space-between;"> <div> <input checked="" type="checkbox"/> the receiving Office <input type="checkbox"/> the International Searching Authority <input type="checkbox"/> the International Preliminary Examining Authority </div> <div> <input type="checkbox"/> the designated Offices concerned <input checked="" type="checkbox"/> the elected Offices concerned <input type="checkbox"/> other: </div> </div>		

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Catherine MASSETTI Telephone No.: (41-22) 338.83.38
--	---

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year)

05 June 2001 (05.06.01)

International application No.

PCT/SE00/01927

Applicant's or agent's file reference

56930-62060

International filing date (day/month/year)

05 October 2000 (05.10.00)

Priority date (day/month/year)

05 October 1999 (05.10.99)

Applicant

NILSSON, Ivar

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

06 April 2001 (06.04.01)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
 34, chemin des Colombettes
 1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

J. Leitao

Telephone No.: (41-22) 338.83.38

From the INTERNATIONAL BUREAU

PCTCOMMUNICATION IN CASES FOR WHICH
NO OTHER FORM IS APPLICABLE

To:

BOVARD LTD.
Optingenstrasse 16
CH-3000 Berne 25
SUISSEDate of mailing (day/month/year)
06 November 2001 (06.11.01)Applicant's or agent's file reference
56930-62060**REPLY DUE**
see paragraph 1 belowInternational application No.
PCT/SE00/01927International filing date (day/month/year)
05 October 2000 (05.10.00)

Applicant

VSL INTERNATIONAL AG

1. ☐ REPLY DUE within _____ months/days from the above date of mailing
- ☐ NO REPLY DUE, however, see below
- ☐ IMPORTANT COMMUNICATION
- ☐ INFORMATION ONLY

2. COMMUNICATION:

Pursuant to your fax letter dated 22 october 2001 and our telephone conversation, please be informed that the Demand for chapter II received at the IPEA/EP on 06 April 2001 has been withdrawn by mistake.

Said Demand will be reinstated and the IPER received on 26 September 2001 sent to the elected States.

Please disregard form PCT/IB/339 (notification of withdrawal of Demand or elections) dated 25 September 2001 sent in error.

The International Bureau regrets any inconvenience that this error may have caused.

A copy of this letter is being sent to the IPEA/EP, and the elected States.

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No. (41-22) 740.14.35

Authorized officer

Catherine MASSETTI

Telephone No. (41-22) 338.83.38

BEST AVAILABLE COPY

ENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF WITHDRAWAL OF DEMAND OR ELECTIONS

(PCT Rules 90*bis*.1 and 90*bis*.4
and Administrative Instructions, Section 415(b) and (c))

To:

BOVARD LTD.
Optingenstrasse 16
CH-3000 Berne 25
SUISSE

Date of mailing (*day/month/year*)
25 September 2001 (25.09.01)

Applicant's or agent's file reference
56930-62060

IMPORTANT NOTIFICATION

International application No.
PCT/SE00/01927

International filing date (*day/month/year*)
05 October 2000 (05.10.00)

Applicant
VSL INTERNATIONAL AG

The applicant is hereby notified that the International Bureau received, on 10 May 2001 (10.05.01),
a notice effecting withdrawal of:

☒ the demand

☐ the election of the following States:

☐ for an ARIPO patent (*specify "all States" or, if the withdrawal concerns only some States, specify those States only by indicating the two-letter country codes*):

☐ for a Eurasian patent

☐ for a European patent (*specify "all States" or, if the withdrawal concerns only some States, specify those States only by indicating the two-letter country codes*):

☐ for an OAPI patent

☐ for a national patent (*specify the States by indicating the two-letter country codes*):

ATTENTION

The withdrawal does not affect the international application in respect to any elected State in which the national phase has already started.

If they are affected by the withdrawal, the receiving Office, the International Searching Authority, the International Preliminary Examining Authority and the elected Offices concerned have been informed accordingly.

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer

Catherine MASSETTI

Facsimile No. (41-22) 740.14.35

Telephone No. (41-22) 338.83.38

BEST AVAILABLE COPY

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

BOVARD AG

11. FEB. 2002

BOVARD LTD.
Optingenstrasse 16
CH-3000 Bern 25
SUISSE

152288.24 73

Date of mailing (day/month/year) 06 February 2002 (06.02.02)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 56930-62060	
International application No. PCT/SE00/01927	International filing date (day/month/year) 05 October 2000 (05.10.00)

1. The following indications appeared on record concerning:

☒ the applicant ☐ the inventor ☐ the agent ☐ the common representative

Name and Address VSL INTERNATIONAL AG Bernstrasse 9 CH-3421 Lyssach Switzerland	State of Nationality CH	State of Residence CH
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person ☐ the name ☒ the address ☐ the nationality ☐ the residence

Name and Address VSL INTERNATIONAL AG Scheibenstrasse 70 CH-3014 Berne Switzerland	State of Nationality CH	State of Residence CH
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	

3. Further observations, if necessary:

A copy of this notification has been sent to:

the receiving Office

the International Searching Authority

International Preliminary Examining Authority

☐ the designated Offices concerned
☒ the elected Offices concerned
☐ other:

 the International Bureau of WIPO
 34, chemin des Colombettes
 1211 Geneva 20, Switzerland

(7) 740.14.35

(1994)

Authorized officer

Catherine MASSETTI

Telephone No.: (41-22) 338.83.38

004643440

PATENT COOPERATION TREATY

15

PCT

From the INTERNATIONAL BUREAU

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

To:

PETRÉ, D.
Albihns Patentbyrå Stockholm AB
P.O. Box 5581
S-114 85 Stockholm
SUÈDE

Date of mailing (day/month/year) 19 April 2001 (19.04.01)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 56930-62060	
International application No. PCT/SE00/01927	International filing date (day/month/year) 05 October 2000 (05.10.00)

1. The following indications appeared on record concerning:

☒ the applicant ☐ the inventor ☐ the agent ☐ the common representative

Name and Address INTERNORDISK SPÄNNARMERING AB S-169 83 Stockholm Sweden	State of Nationality SE	State of Residence SE
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒ the person ☐ the name ☐ the address ☒ the nationality ☒ the residence

Name and Address VSL INTERNATIONAL AG Bernstrasse 9 CH-3421 Lyssach Switzerland	State of Nationality CH	State of Residence CH
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒ the receiving Office ☒ the designated Offices concerned
☐ the International Searching Authority ☐ the elected Offices concerned
☐ the International Preliminary Examining Authority ☐ other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Jean-Marie McAdams
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 152299.2/NL/mb	<div style="display: flex; justify-content: space-between;"> <div> FOR FURTHER ACTION </div> <div> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) </div> </div>	
International application No. PCT/SE00/01927	International filing date (<i>day/month/year</i>) 05/10/2000	Priority date (<i>day/month/year</i>) 05/10/1999
International Patent Classification (IPC) or national classification and IPC F16G11/08		
Applicant VSL INTERNATIONAL AG et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 06/04/2001	Date of completion of this report 24.09.2001
Name and mailing address of the international preliminary examining authority: <div style="display: flex; align-items: center;"> <div> European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 </div> </div>	Authorized officer Hytrowski, P Telephone No. +49 89 2399 2858



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/SE00/01927

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-14 as originally filed

Claims, No.:

1-14 as originally filed

Drawings, sheets:

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/SE00/01927

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-14
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-14
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-14
	No:	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

No document of the prior art discloses the entire features of claims 1 or 11.

The closest prior art is represented by a connecting element for joining two support members absorbing tensile forces, comprises at least a first and a second casing body with a through-hole for receiving the respective support members, which casing bodies can be joined together by way of a joining section at a first end of each casing body, the opposing second end of each casing body being provided with locking members for holding the support members fast.

Document GB-A-1 193 906 discloses a quick-release coupling comprising a pair of elongated body members. The body members have in their inner flat side sockets cooperating together in order to receive enlargements of the cables. Not through-hole for receiving the cables is foreseen.

Document EP-0 228 165 discloses a connecting apparatus having first an second connecting elements each having an end piece to which a cable is connected. The end pieces are connected together in and by a nut member surrounding the end pieces. The end pieces are not connected together by way of a joining section at a first end of each end piece.

Document GB-A-960 436 discloses a coupling for attachment to an elongated non-tubular flexible member of circular cross-section. This coupling is not suitable for connecting two support members absorbing tensile forces.

The object of the invention is to produce a connecting element, which produces axial locking of the support member, whilst the latter is free to rotate in the connecting element.

This is achieved by a connecting element in which in a working position the locking member of at least one casing body produces an axial locking of the support member running through the casing body by way of a stop part created on the support member

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/SE00/01927

within the area of the second end of the casing body. Such a locking member remains without example in the prior art.

Claims 2 to 10 are dependent on new and inventive claim 1.

The object of the invention is furthermore to produce a connecting element that can be rapidly fitted to and detached from a bracing wire during the construction of a structure, in order to thereby save construction costs.

This is achieved by a method of fitting support members to a building construction by means of the connecting element as claimed in claim 11 in new and non-suggested manner.

Claims 12 to 14 are dependent on new and inventive claim 11.

Thus, claims 1 to 14 fulfill the requirements of Articles 33(2) and 33(3) PCT.

Re Item VII

Certain defects in the international application

The terminology and the signs are not consistent throughout the applications because firstly, the reference sign 20 is designated either by "boss" in the description or by "stop part" in the claims and secondly, because the reference signs 15 and 16 designating the locking members are not present in the description and in the drawings.

RECORD **PCT** REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only	
International Application No.	PCT/SE 00 / 0 1 9 2 7
International Filing Date	0 5 -10- 2000
<div style="border: 2px solid black; padding: 5px; text-align: center;"> The Swedish Patent Office PCT International Application </div>	
Name of receiving Office and "PCT International Application"	

Applicant's or agent's file reference 56930-62060
(if desired) (12 characters maximum)

Box No. I	TITLE OF INVENTION CONNECTING DEVICE		
Box No. II	APPLICANT		
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)		<input type="checkbox"/> This person is also inventor.	
INTERNORDISK SPÄNNARMERING AB SE-169 83 STOCKHOLM Sweden		Telephone No.	
		Facsimile No.	
		Teleprinter No.	
State (that is, country) of nationality: SE		State (that is, country) of residence: SE	
This person is the applicant for the purposes of: <input type="checkbox"/> all designated States <input checked="" type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box			
Box No III	FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)		
Name and address: Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)		This person is:	
NILSSON, Ivar Fänkolsgränd 30 SE-182 45 ENEBYBERG Sweden		<input type="checkbox"/> applicant only	
		<input checked="" type="checkbox"/> applicant and inventor	
		<input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.)	
State (that is, country) of nationality: SE		State (that is, country) of residence: SE	
This person is the applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input checked="" type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box			
<input type="checkbox"/> Further applicants and/or (further) inventors are indicated on a continuation sheet.			
Box No. IV	AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE		
The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:		<input checked="" type="checkbox"/> agent <input type="checkbox"/> common representative	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)		Telephone No.	
PETRÉ, D; BERG S A; FAGERLIN H; HAMMAR E; LETTSTRÖM R; KIERKEGAARD, L-O; LAGMAN, S; ALBIHNS PATENTBYRÅ STOCKHOLM AB, P.O. Box 5581, S-114 85 STOCKHOLM, Sweden		+46 8 59 88 72 00	
		Facsimile No.	
		+46 8 59 88 73 00	
		Teleprinter No.	
		11942 ALBIHNS S	
<input type="checkbox"/> Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.			

Box No. V DESIGNATION STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):
Regional Patent

- ☒ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting state of the Harare Protocol and of the PCT
- ☒ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is Contracting State of the European Patent Convention and of the PCT
- ☒ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line).....

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | |
|---|---|
| <input checked="" type="checkbox"/> AE United Arab Emirates..... | <input checked="" type="checkbox"/> LC Saint Lucia..... |
| <input checked="" type="checkbox"/> AG Antigua & Barbuda..... | <input checked="" type="checkbox"/> LK Sri Lanka..... |
| <input checked="" type="checkbox"/> AL Albania..... | <input checked="" type="checkbox"/> LR Liberia..... |
| <input checked="" type="checkbox"/> AM Armenia..... | <input checked="" type="checkbox"/> LS Lesotho..... |
| <input checked="" type="checkbox"/> AT Austria..... | <input checked="" type="checkbox"/> LT Lithuania..... |
| <input checked="" type="checkbox"/> AU Australia..... | <input checked="" type="checkbox"/> LU Luxembourg..... |
| <input checked="" type="checkbox"/> AZ Azerbaijan..... | <input checked="" type="checkbox"/> LV Latvia..... |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina..... | <input checked="" type="checkbox"/> MA Morocco..... |
| <input checked="" type="checkbox"/> BB Barbados..... | <input checked="" type="checkbox"/> MD Republic of Moldova..... |
| <input checked="" type="checkbox"/> BG Bulgaria..... | <input checked="" type="checkbox"/> MG Madagascar..... |
| <input checked="" type="checkbox"/> BR Brazil..... | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia..... |
| <input checked="" type="checkbox"/> BY Belarus..... | <input checked="" type="checkbox"/> MN Mongolia..... |
| <input checked="" type="checkbox"/> BZ Belize..... | <input checked="" type="checkbox"/> MW Malawi..... |
| <input checked="" type="checkbox"/> CA Canada..... | <input checked="" type="checkbox"/> MX Mexico..... |
| <input checked="" type="checkbox"/> CH and LI Switzerland and Liechtenstein..... | <input checked="" type="checkbox"/> MZ Mozambique..... |
| <input checked="" type="checkbox"/> CN China..... | <input checked="" type="checkbox"/> NO Norway..... |
| <input checked="" type="checkbox"/> CR Costa Rica..... | <input checked="" type="checkbox"/> NZ New Zealand..... |
| <input checked="" type="checkbox"/> CU Cuba..... | <input checked="" type="checkbox"/> PL Poland..... |
| <input checked="" type="checkbox"/> CZ Czech Republic..... | <input checked="" type="checkbox"/> PT Portugal..... |
| <input checked="" type="checkbox"/> DE Germany..... | <input checked="" type="checkbox"/> RO Romania..... |
| <input checked="" type="checkbox"/> DK Denmark..... | <input checked="" type="checkbox"/> RU Russian Federation..... |
| <input checked="" type="checkbox"/> DM Dominica..... | <input checked="" type="checkbox"/> SD Sudan..... |
| <input checked="" type="checkbox"/> DZ Algeria..... | <input checked="" type="checkbox"/> SE Sweden..... |
| <input checked="" type="checkbox"/> EE Estonia..... | <input checked="" type="checkbox"/> SG Singapore..... |
| <input checked="" type="checkbox"/> ES Spain..... | <input checked="" type="checkbox"/> SI Slovenia..... |
| <input checked="" type="checkbox"/> FI Finland..... | <input checked="" type="checkbox"/> SK Slovakia..... |
| <input checked="" type="checkbox"/> GB United Kingdom..... | <input checked="" type="checkbox"/> SL Sierra Leone..... |
| <input checked="" type="checkbox"/> GD Grenada..... | <input checked="" type="checkbox"/> TJ Tajikistan..... |
| <input checked="" type="checkbox"/> GE Georgia..... | <input checked="" type="checkbox"/> TM Turkmenistan..... |
| <input checked="" type="checkbox"/> GH Ghana..... | <input checked="" type="checkbox"/> TR Turkey..... |
| <input checked="" type="checkbox"/> GM Gambia..... | <input checked="" type="checkbox"/> TT Trinidad and Tobago..... |
| <input checked="" type="checkbox"/> HR Croatia..... | <input checked="" type="checkbox"/> TZ United Republic of Tanzania..... |
| <input checked="" type="checkbox"/> HU Hungary..... | <input checked="" type="checkbox"/> UA Ukraine..... |
| <input checked="" type="checkbox"/> ID Indonesia..... | <input checked="" type="checkbox"/> UG Uganda..... |
| <input checked="" type="checkbox"/> IL Israel..... | <input checked="" type="checkbox"/> US United States of America..... |
| <input checked="" type="checkbox"/> IN India..... | <input checked="" type="checkbox"/> UZ Uzbekistan..... |
| <input checked="" type="checkbox"/> IS Iceland..... | <input checked="" type="checkbox"/> VN Viet Nam..... |
| <input checked="" type="checkbox"/> JP Japan..... | <input checked="" type="checkbox"/> YU Yugoslavia..... |
| <input checked="" type="checkbox"/> KE Kenya..... | <input checked="" type="checkbox"/> ZA South Africa..... |
| <input checked="" type="checkbox"/> KG Kyrgyzstan..... | <input checked="" type="checkbox"/> ZW Zimbabwe..... |
| <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea..... | |
| <input checked="" type="checkbox"/> KR Republic of Korea..... | |
| <input checked="" type="checkbox"/> KZ Kazakhstan..... | |

Check boxes reserved for designating States which have become Party to the PCT after issuance of this sheet:

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

05-10-2000

Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claim indicated in the Supplemental Box		
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country:	regional application:* regional Office	international application: receiving Office
item (1) 5 October 1999	9903585-9	Sweden		
item (2)				
item (3)				

☒ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s) : 1

* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See supplemental Box.

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) (If two or more international Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

ISA /SE

Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):

Date (day/month/year): Number Country (or regional Office)

5 October 1999

SE 99/01308 Sweden

Box No. VIII CHECK LIST; LANGUAGE OF FILING

This international application contains the following number of sheets:

request: 3 ✓

description (excluding

sequence listing part): 12 ✓

claims: 3 ✓

abstract: 1 ✓

drawings: 9 ✓

sequence listing part
of description:

Total number of sheets: 28 ✓

This international application is accompanied by the item(s) marked below:

1. ☒ fee calculation sheet ✓
2. ☐ separate signed power of attorney
3. ☐ copy of general power of attorney; reference number, if any:
4. ☐ statement explaining lack of signature
5. ☐ priority document(s) identified in Box No. VI as item(s):
6. ☐ translation of international application into (language):
7. ☐ separate indications concerning deposited microorganism or other biological material
8. ☐ nucleotide and/or amino acid sequence listing in computer readable form
9. ☒ other (specify): Copy of ITS-report and Official Action ✓

Figure of the drawings which
should accompany the abstract: Fig. 4

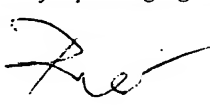
Language of filing of the
international application: Swedish

Box No. IX SIGNATURE OR APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).



Dag Petre



1. Date of actual receipt of the purported international application:	For receiving Office use only 05-10-2000	2. Drawings:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		<input checked="" type="checkbox"/> received:
4. Date of timely receipt of the required corrections under PCT-Article 11(2):		<input type="checkbox"/> not received:
5. International Searching Authority (if two or more are competent): ISA/ SE	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid	

Date of receipt of the record copy
by the International Bureau:

08 NOVEMBER 2000

For International Bureau use only

(08.11.00)

Förbindelseelement

Föreliggande uppfinning avser ett förbindelseelement för skarvning av två dragkrafter upptagande bärorgan, vilket förbindelseelement innefattar åtminstone en första och en andra hylskropp med ett genomgående hål för upptagande av respektive bärorgan, vilka hylskroppar är anslutningsbara med varandra via ett anslutningsparti vid en första ände hos respektive hylskropp, varvid motstående respektive hylskropps andra ände är försedd med låsorgan för fasthållning av bärorganen.

- 10 Uppfinningen kan hänföras till byggindustrin, men är ej begränsande till denna. Förbindelseelement, eller så kallade linlås, används för att skarva bärorgan, såsom linkärnor vid spännlinor etc, med varandra. Skarvningen kan ske under själva monteringsförloppet av en kabel, bestående av ett flertal sådana spännlinor, där en dragning av varje spännlina sker separat.

15

När linan är uppsträckt med önskad kraft, kan linan låsas permanent med hjälp av en kilanordning mot ett fundament vid den byggdel som skall spännas. Därefter kan förbindelseelementet avlägsnas från den uppsträckta linan och fastsättas vid en ny lina för indragning.

20

Kablar används främst för förankring av olika byggdelar med varandra, såsom byggdelar vid broar, master, byggnader etc. Dessa kablar kan dels användas för stagning efter det att byggdelarna är monterade, dels kan de användas under själva byggnadens uppförande. Kablar innefattande dylika bärorgan, såsom linor, kan användas vid brokonstruktioner, såsom hängbroar, snedstagbroar etc.

25

Kända linlås lider allmänt av nackdelen att de är otympliga vid handhavandet och tar lång tid att montera och demontera, vilket innebär stora kostnader. De har även en tendens att skruva upp sig, och/eller nypa fast vid linkärnan, vilket försvårar demonteringen av hylskroppen. Vidare innebär fastnypningen av de olika delarna hos

30

kända linlås, att de sitter så hårt fast efter dragningen av linan att anordningarna måste kasseras, vilket resulterar i stora kostnader och en onödigt stor materialåtgång.

5 Känd teknik lider alltså av bristen på flexibilitet vid framförallt demonteringen, då dessa konstruktioner ofta nyper fast i linan. Konstruktionerna enligt känd teknik har i en del utföranden kilar som orsakar ovan beskrivna problem. Kilar är vanligt förekommande inom spännbetongutrustningar. Kilarna i konstruktionen enligt känd teknik har även en förmåga att hamna snett i den hylsdel, genom vilken linan löper, vilket ytterligare komplicerar handhavandet och gör detta onödigt kostsamt.

10

Linan är ej heller roterbart anslutningsbar till konstruktionen enligt känd teknik. Detta medför att onödiga vridmoment påverkar förbindelseelementet, med risk för uppskruvning av detsamma.

15 Uppfinningens ändamål är att åstadkomma ett förbindelseelement, som åstadkommer en axiell låsning av bärorganet, samtidigt som detta kan vara frigjort roterbart i förbindelseelementet.

20 Ett annat ändamål med uppfinningen är att åstadkomma ett förbindelseelement, som är låsbart i sitt arbetsläge. Det vill säga i det läge, då en indragning av exempelvis en spännlina kan ske.

Förbindelseelementet skall också ha så få utskjutande delar som möjligt, så att exempelvis en lina inte fastnar i detsamma under själva byggarbetet.

25

Förbindelseelementet ska vidare möjliggöra en god flexibilitet, medge ett kontrollerbart monterings- och demonteringsförfarande och åstadkomma en säker användning för byggpersonalen vid monteringen och demonteringen av exempelvis en draglina från en spännlina, såsom är brukligt exempelvis vid byggnationen av en bro, byggnad etc. Draglinan kan vara en tråd av samma material och dimension som
30 linkärnan hos den spännlina som skall dras in, men kan även vara av annat material

och med en annan dimension. Draglinan kan således användas vid ett återkommande arbetsmoment med indragning av ett flertal spännlinor.

5 Detta uppnås genom ett förbindelseelement av i inledningen angivet slag, där låsorganet hos åtminstone den ena hylskroppen i ett arbetsläge åstadkommer en axiell låsning av det genom hylskroppen löpande bärorganet via en inom området för den andra änden hos hylskroppen på bärorganet åstadkommen stoppdela.

10 Ytterligare lösningar på ändamål med och egenskaper hos uppfinningen anges i de övriga patentkraven.

Uppfinningen medför att risken för brottanvisning på linkärnan minskar, emedan förbindelseelementet enligt uppfinningen tillåter en rotation av linan.

15 Uppfinningen medför att ett förbindelseelement har åstadkommit, som är enkelt och snabbt låsbart i arbetsläget, och som förhindrar en oönskad uppskruvning av detsamma.

20 Med ett sådant förbindelseelement åstadkommes också att antalet delar reduceras i väsentlig grad jämfört med känd teknik, vilket ger en större driftsäkerhet. I och med att linkärnan eller förbindelseelementet är fritt roterbart, undviks oönskade spänningar i linan, eller att vridkrafter påverkar draglinan respektive spännlinan. Likaså uppstår inga vridkrafter som kan påverka förbindelseelementet att gånga upp sig.

25 Ändamålet är vidare att åstadkomma ett förbindelseelement, som går snabbt att montera samt demontera från en spännlina under byggnationen av en byggnad, för att på så sätt spara byggkostnader.

30 Detta uppnås genom ett förfarande att anbringa bärorgan vid en byggnadskonstruktion medelst förbindelseelementet av i inledningen angivet slag, vilket förfarande innebär att en draglina genomföres ett kabelrör tillsammans med förbindelseelementet så att

förbindelseelementet hamnar vid ett område för ett första fundament, en spännlina anslutes till det vid draglinan kopplade förbindelseelementet, spännlinan genomföres i motsatt riktning genom kabelröret med hjälp av draglinan och det ihopkopplade förbindelseelementet så att förbindelseelementet hamnar vid ett område för ett andra
5 fundament, spännlinan fastsättes vid det första respektive andra fundamentet, och att förbindelseelementet bortkopplas från spännlinan.

Med ett sådant förfarande åstadkommes ett snabbt och enkelt sätt att applicera ett bärorgan, såsom en spännlina vid ett byggnadsverk, såsom en snedstagsbro.

10

Uppfinningen kommer närmare beskrivas i form av utföringsexempel med hänvisning till bifogade figurer, vari

15

fig.1 schematiskt visar en perspektivvy av ett förbindelseelement enligt en första utföringsform hos uppfinningen,

fig. 2 schematiskt visar en sidovy av ett förbindelseelement enligt den första utföringsformen hos uppfinningen i ett isärtagat tillstånd,

20

fig. 3 schematiskt visar ett snitt av en del av förbindelseelementet enligt den första utföringsformen hos uppfinningen,

fig. 4 schematiskt visar en perspektivvy av ett förbindelseelement enligt en andra utföringsform hos uppfinningen,

25

fig. 5 schematiskt visar en sidovy av ett förbindelseelement enligt den andra utföringsformen hos uppfinningen i ett isärtagat tillstånd,

30

fig. 6 schematiskt visar en sidovy av förbindelseelementet enligt den andra utföringsformen i ett monterat läge,

fig. 7 schematiskt visar en sidovy av uppfinningen visad i fig. 6 i ett icke färdigmonterat läge,

fig. 8 schematiskt visar ett exempel på en fixeringsenhet i fig. 6 och 7, och

5

Fig. 9 schematiskt visar förbindelseelementets användande vid byggnationen av en snedstagsbro.

10

15

20

Med arbetsläge menas det tillstånd, då skarvhylsan är monterad och låst mellan två linändar. I fig. 1 visas ett förbindelseelement 1 enligt en första utföringsform av uppfinningen i ett isärtagat tillstånd. Förbindelseelementet 1 är i fig. 1 avsett att förbinda en draglina 2 med en spännlina 3. Förbindelseelementet 1 innefattar en första och en andra hylskropp 5 och 6, vari den första hylskroppen 5 är avsedd att sammankopplas med draglinan 2, vilken vid byggnationen är avsedd att dra ett antal spännlinor 3 en i taget i ett kabelrör (inte visat i fig. 1, visat som 56 i fig. 9). När draglinan 2 genomförts den första hylskroppen 5 stukas draglinans ände till en knopp 20. På så sätt kan knoppen 20 tillverkas av samma material som spännlinan 3. Detta har den fördelen att inget ytterligare material behöver finnas på byggarbetsplatsen för åstadkommandet av knoppen 20. Stukningen är med fördel utförd med en avrundad form. Därmed kan med enkla medel en stoppdel åstadkommas.

25

30

En skarvmuff 27 försedd med gänga 25 (endast delvis illustrerad i fig. 1) gängas därefter till en första ände 11 hos hylskroppen 6 så att knoppen 20 ligger an mot en inuti hylskroppen belägen ansats 26 (se fig. 3) och så att en låspinne 35 kan slås ner genom en borrning 35' och motsvarande hål 35'' hos skarvmuffen 27. Därmed kan exempelvis den hylskropp 5 som är avsedd för en mer permanent infästning, det vill säga den hylskropp 5 som håller draglinan 2 etc, förses med en i större grad permanent fixeringsanordning av hylskroppen 5 till skarvmuffen 27. På så sätt låses draglinan 2 till förbindelseelementet 1 på ett enkelt sätt. Detta innebär ett driftsäkert handhavande och ett enkelt monterings- och demoneringsförfarande.

Hylskropparna 5 och 6 är försedda med ett genomgående hål 7 för upptagande av draglinan 2 och spännlinan 3. Detta hål 7 är utsträckt i förbindelseelementets 1 längdriktning. I och med en andra ände 13 hos respektive hylskropp 5 och 6 innefattar en borrning 8 som har mindre diameter än knoppens 20 diameter, kan knoppen 20
5 stödja sig mot en inuti hylskroppen belägen ansats 26 (se fig. 3). På så sätt anligger vid arbetsläget hos spännlinans 3 knopp 20 mot hylskroppens 6 ansats 26 fritt roterbart, åstadkommande en axiell låsning av spännlinan. Ansatsen 26 är formad så att hylskroppens 6 inre diameter tillåtes att inrymma knoppen 20.

10 Detta beskrivna förhållande gäller även draglinans 2 koppling till hylskroppen 5.

Förbindelseelementets 1 hylskropp 6 är även anslutningsbart anordnad vid skarvmuffens 27 motsvarande ände medelst en gänga 25 hos skarvmuffen 27 (gängan 25 är endast delvis illustrerad). En motsvarande gänga 25' är åstadkommen i
15 hylskroppen 6 (se fig. 2). Därmed kan två stycken hylskroppar 5 och 6 anslutas till varandra, varav den ena hylskroppen 5 är kopplad till draglinan 2 och den andra hylskroppen 6 fasthåller en spännlina 3 som skall dragas. Företrädesvis anligger en ände 20' hos skarvmuffen 27 mot knoppen 20 vid anslutningen av skarvmuffen 27 till hylskroppen 6, vilket innebär att knoppen 20 hamnar i ett läge mot den första ansatsen
20 26 före dragningen av spännlinan 3.

Vid monteringen av den hylskropp 6 som fasthåller spännlinan 3 hamnar ett urtag 29 vid en låsskrufs 31 skalle 33. Detta låsarrangemang och förfarandet vid låsning av detta kommer att beskrivas vidare nedan.

25

Fig. 2 visar schematiskt huvuddelarna hos ett förbindelseelement 1 enligt den första utföringsformen i en sidovy. Den första hylskroppen 5 innefattar således det genomgående hålet 7 som är utformat stegformigt med en första ansats 26, mot vilken knoppen (visad i fig. 1) kan stödja sig. Med fördel är denna ansats 26 avfasad med en
30 avfasning 25 för att ge stöd mot knoppens 20 runda form och så att ansatsen 26 inte skär in i knoppen 20. Vid den första änden 11 hos hylskroppen 6 finns ett

anslutningsparti 9. En invändig gänga 25' är här åstadkommen i det genomgående hålet 7 för att kunna uppta skarvmuffens 27 gänga 25. Ett gängat hål 31' är åstadkommet i skarvmuffen 27 för upptagande av en låsskruv 31 (inte visad i fig. 2, se fig. 1, 6, 7 och 8). I fig. 2 visas även borrarboringen 35' och det motsvarande hålet 35'' för upptagande av låspinnen 35 (se fig. 1).

I fig. 3 visas en del av förbindelseelementet 1 enligt den första utföringsformen. I fig. 3 visas hur spännlinan 3 med sin knopp 20 upptas av ansatsen 26 med sin avfasning 25. För att avlägsna hylskroppen 6 från spännlinan 6 kan linan klippas av i närheten av förbindelseelementet 1 och därefter kan linänden med knoppen 20 tas bort. Vid ny skarvning kan nu en ny linände föras in genom borrarboringen 8 och hålet 7 för att sedan stukas med hjälp av en knoppmaskin.

Fig. 4 och 5 visar en andra utföringsform hos uppfinningen, där förbindelseelementet 1 är isärtaget. Hänvisningsbeteckningarna visade i dessa figurer motsvarar i stort de i fig. 1 visade. Skillnaden mot det första utföringsexemplet är bland annat att borrarboringen 8' har en större diameter än knoppen 20. Därav har två knaster 17 och 18 åstadkommit för att utgöra ett stöd mellan respektive hylskropp 5 och 6 ansats 26 och respektive knopp 20. Dessa knaster 17 och 18 bildar tillsammans i ett arbetsläge en stopphylsa 22. Denna stopphylsa 22 bildar en andra ansats 26' (se fig. 6), mot vilken knoppen 20 stödjer sig. Hylsdelarna som utgör knasterna 17 och 18 är i fig. 4 formade utan någon ansats på insidan. Det vill säga, knoppen 20 stödjer sig mot den bildade stopphylsans 22 ena ände i arbetsläget. Med fördel kan den andra ansatsen 26' vara bildad inuti stopphylsan 22 (se fig. 5). På så sätt kan knoppen 20 vid ihopkopplingen av spännlinan 3 till förbindelseelementet 1 styras in med hjälp av ett runt om den andra ansatsen 26' bildat huvudsakligen cylindriskt flänsområde 22' vid stopphylsan 22 och på så sätt korrekt hamna vid den andra ansatsen 26'. Denna styrning innebär att knoppen 20 hamnar huvudsakligen centralt i hylskroppen 6, utan att inverka på eller påverkas av hylskroppens 6 inre yta. I fig. 5 visas schematiskt en sidovy av förbindelseelementet 1 i fig. 4 och dess huvudsakliga delar. Här är den ena av knasterna 17 åskådliggjorda för att illustrera den andra ansatsen 26' som utgör ett stöd för knoppen 20.

Med fördel används ett hårdare material till hylsdelarna 17 och 18 än till hylskropparna 5 och 6. Detta hårdare material är ofta dyrare. I och med att hylsdelarna 17 och 18 är utbytbara, kan materialkostnaden reduceras. Detta på grund av att man vid eventuell förslitning, endast behöver byta hylsdelarna 17 och 18. Hylsdelarna eller knasterna är med fördel två till antalet, men kan vara flera. De är så formade, att de vid isärtagande från spännlinan 3 medger att spännlinan 3 med sin knopp 20 kan föras bort från hylskroppen 6 utan att knoppen 20 behöver avlägsnas eller linan klippas av. Detta möjliggörs med hjälp av att borrhningen 8' har en större diameter än knoppen 20.

I fig. 6 visas schematiskt ett vid en spännlina 3 och en draglina 2 monterat förbindelseelement 1 enligt den andra utföringsformen. De i fig. 6 och 7 förekommande hänvisningsbeteckningarna motsvarar de tidigare beskrivna och visade hänvisningsbeteckningarna, dock måste observeras att förbindelseelementet är sett från ett annat håll än det i fig. 3-5 visade. Tydligt visas i fig. 6 hur spännlinan 3 och draglinan 2 anligger mot respektive knaster 17 och 18 (endast 17 är visad i fig. 6 och 7, emedan 18 är skyddad). Knasterna 17 och 18 anligger i sin tur mot en ansats 24.

Knopparna 20 åstadkomna vid respektive linände anligger vid arbetsläget via knasterna 17 och 18 mot hylskroppen 5 och 6 fritt roterbara, åstadkommande en axiell låsning av respektive linände. Antalet delar har på så sätt reducerats i väsentlig grad jämfört med känd teknik, vilket ger en större driftsäkerhet. I och med att linkärnan eller förbindelseelementet är fritt roterbart, undviks oönskade spänningar i linan. Spänningar orsakade av kända konstruktioner som finns på marknaden, har resulterat i olyckor vid arbetet med att sträcka upp eller dra linor. Knoppen 20 åstadkommes efter eller före det att spännlinan 3 förts genom hylskroppens 6 borrhning 8'. Borrhningen 8' har således en större diameter än knoppen 20.

Härvid kan exempelvis de två hylsdelarna, såsom knaster utformade, medgöra att montering och demontering av hylskroppen till och från spännlinan 3 kan ske utan att linan behöver klippas. Således behöver inte knoppen 20 avlägsnas vid demonteringen,

vilket minskar arbetstiden under indragningen av en kabel, som i sig kan innefatta uppemot 80 linor. Likaså medgör de två hylsdelarna 17 och 18, mot vilka knoppen 20 anligger, att dels kan linans kärna rotera på grund av att knoppen 20 i sig har möjlighet att rotera relativt den andra ansatsen 26' hos den av knasterna 17 och 18 formade stopphylsan 22, dels kan själva stopphylsan 22 rotera i hylskroppen 6. Detta innebär en minimal förslitning av anordningen enligt uppfinningen, då friktionen fördelas över flera ytor i förbindelseelementet. Förbindelseelementet 1 enligt uppfinningen innefattar liknande låsorgan både för den lina som skall spännas och för själva draglinan. Detta innebär ytterligare en möjlighet för linan att kunna rotera och ett ytterligare mindre slitage.

Med hjälp av en låsskruv 31 innefattande en avfasad skalle 33 låses hylskroppen 6 till skarvmuffen 27. Avfasningen är företrädesvis ett plan 32. Planet 32 är vid det monterade läget vänt från hylskroppen 6 så att skallens 32 icke avfasade parti upptages av urtaget 29 för låsning. På så sätt kan hylskroppen 6 låsas vid skarvmuffen 27, vilket förhindrar att hylskroppen 6 ofrivilligt kan frigöras från hylskroppen 6 på ett icke önskvärt sätt. Skallen 33 upptas av urtaget 29 hos hylskroppen 6 i en sådan utsträckning att ingen del av det utskjutande organet sticker ut utanför hylskroppens omfång. Därmed undvikes att linor eller andra föremål fastnar i förbindelseelementet. Förbindelseelementet har ävenså avrundade hörn h, för att medge en smidig transport av detsamma från ett läge till ett annat. Då skallen 33 på ett enkelt sätt upptas av urtaget 29 och anordningen kan handhas på ett enkelt och snabbt sätt, kan stora tidsvinster göras. Samtidigt tryggas säkerheten vid byggarbetsplatsen då en dubbel säkerhet mot urgängning har åstadkommits. Dels åstadkommer det fritt roterbara förbindelseelementet 1 att elementet roterar över respektive knapp 20 och på så vis eliminerar vridkrafter påverkande anslutningspartiet 9, dels säkras anslutningen medelst nämnda låsskruv 31.

För lossgörning av hylskroppen 6 från skarvmuffen 27 vrides låsskruven 31 ungefär ett halvt varv, så att planet 32 är vänt mot hylskroppen 6, vilket är visat i fig. 7. Pilen P visar vridriktningarna hos låsskruven 31 illustrerad i fig. 6 och 7.

Fig. 7 visar förbindelseelementet 1 enligt uppfinningen, i ett läge där hylskroppen 6 kan frigöras från skarvmuffen 27. Härmed kan hylskroppen 6 frigöras på ett kontrollerat sätt från skarvmuffen 27, vilket i sin tur innebär att linan med knoppen 20 kan avlägsnas hylskroppen 6 på ett enkelt sätt. Vridning av låsskruven 31 kan göras med hjälp av ett verktyg, såsom en insexnyckel.

Fig. 8 visar ett exempel på låsskruv 31 enligt uppfinningen. Planet 32 är med fördel åstadkommet så att dess yta tangerar skruvkroppens mantelyta, det vill säga området för gängen G. Gängen G motsvarar den i skarvmuffen 27 åstadkomna gängen g (se fig 2 och 5). Urtag u för insexnyckel är åstadkommet vid skallen 33.

Fig. 9 visar ett exempel på användningsområde, där förbindelseelementet 1 enligt uppfinningen med fördel användes. Med orden "övre", "undre" etc menas den orientering som är bruklig vid byggnader etc, såsom uppåt, nedåt och så vidare. Proportionerna är för förtydligandet i fig. 9 annorlunda än verkligheten. På ritningen visas schematiskt huvuddelarna hos en snedstagsbro under byggnation. Fig. 9 kan i det följande förklaras tillsammans med fig. 5. Med hjälp av en push-maskin M skjuts en draglina 2 med förbindelseelementet 1 (uppförstorat för förtydligandet av förfarandet) från ett läge vid ett övre fundament 52 vid en pylon 53, till ett nedre fundament 54 vid en brobana 55 för att hämta upp en spännlina 3. Pylonen 53 står på berggrunden b. Vid pylonen 53 är en hiss 60 anordnad för person- och materialtransport. Draglinan 2 skjuts tillsammans med förbindelseelementet 1 genom ett kabelrör 56 till det nedre fundamentet 54, där en lintrumma 57 med spännlina 3 är placerad. Spännlinans 3 ände åstadkommes knoppen 20 (inte visad i fig. 9) med hjälp av en knoppmaskin (inte visad). Enligt den första utföringsformen stukas knoppen 20 efter det att hylskroppen 6 förts på linan. Enligt den andra utföringsformen kan knoppen 20 företrädesvis stukas innan hylskroppen 6 förs på linan.

Spännlinans 3 ände förs in genom hylskroppen 6. Hylsdelar (inte visade i fig. 9, men visade med hänvisningsbeteckning 17 och 18 i fig. 4) placeras omkring spännlinans 3

ände och inuti hylskroppen 6. Spännlinan 3 dras tillbaka så att knoppen 20 bottnar mot knasterna 17 och 18 i hylskroppen 6. Mellandelen, exempelvis en med gänga 25 försedd skarvmuff 27, gängas in i hylskroppen 6 så att skarvmuffens 27 ände 20 trycker in knoppen 20 sista biten mot hylsdelarna 17 och 18 samt hylskroppen 6. På så sätt kan knoppen 20 styras in i ett läge mot ansatsen vid monteringen, vilket åstadkommer att knasterna 17 och 18 hamnar samverkande innan själva dragningen av spännlinan 3 sker. Vid detta moment är låsskruvens 31 skalle 33 med sitt plan 32 vänd mot hylskroppen 6, så att hylskroppen 6 kan vridas till ett läge där urtaget 29 kommer i linje med låsskruven 31 (se fig. 7). Vid detta läge åtdrages företrädesvis låsskruven 180 grader eller åtminstone så mycket att planet 32 inte hamnar inom området för urtaget 29. Detta läge visas i fig. 6. Efter denna åtdragning är låsskruven 31 dragen i sitt bottenläge och med erforderlig kraft samt låser hylskroppen 6 vid skarvmuffen 27. Den andra hylskroppen 5 är låst till skarvmuffen 27 medelst låspinnen 35.

Push-maskinen M, som företrädesvis även kan vara utrustad med dragande drivorgan, drar nu tillbaka spännlinan 3 med hjälp av draglinan 2 och förbindelseelementet 1 genom kabelröret 56 till området för det övre fundamentet 52. Därefter fixeras spännlinan 3 vid det nedre fundamentet på traditionellt vis och klipps av nedanför detta. Spännlinan 51 som nu ligger i kabelröret 56 drages därpå med erforderlig kraft och fastsättes vid det övre fundamentet 52.

Därefter lossas låsskruven 31 till det läge som visas i fig. 7. Det vill säga låsskruven 31 vrids ungefär 180 grader till ett läge där skallens 33 plan 32 står mot hylskroppen 5 i huvudsak vinkelrätt mot hylskroppens längdriktning. Därefter kan hylskroppen 6 skruvas av skarvmuffen 27. Vidare skjutes spännlinans 3 ände tillbaka så att knoppen 20 blottlägges tillsammans med hylsdelarna 17 och 18 (visas i fig. 3), varvid dessa bortplockas vilket resulterar i att spännlinan 3 med sin knapp 20 kan föras ut ur hylskroppen 6. Förbindelseelementets 1 delar kan åter ihopsättas (förbindelseelementet är fortfarande monterat vid draglinan 51) och ånyo skjutas ner med hjälp av draglinan 2 till det nedre fundamentet 54 för att på nytt sammankopplas med en ny ände hos spännlinan 3.

Naturligtvis kan spännlinan 3 fastsättas vid det övre fundamentet 52 först och sedan spännas nedifrån brobanan 55 vid det nedre fundamentet 54 för att sedan fastsättas där. Förbindelseelementet 1 kan tillsammans med draglinan 3 på sätt samtidigt som själva
5 fastsättningen av spännlinan sker, föras till det nedre fundamentet 54.

Denna ovan beskrivna ner och uppskjutning av draglinan med förbindelseelementet kan ske ett åttiotal gånger i ett kabelrör 56, då ett kabelrör generellt kan innehålla uppemot detta antal spännlinor. En snedstagsbro kan i sin tur innefatta uppemot ett
10 hundratal kabelrör. Genom uppfinningen åstadkommes således en stor tidsvinst vid monteringen av dessa spännlinor. Dessutom uppvisar uppfinningen en stor driftsäkerhet och är okomplicerad att handha.

Patentkrav

1. Förbindelseelement för skarvning av två dragkrafter upptagande bärorgan (2, 3), vilket förbindelseelement (1) innefattar åtminstone en första och en andra
5 hylskropp (5, 6) med ett genomgående hål (7) för upptagande av respektive bärorgan (2, 3), vilka hylskroppar (5, 6) är anslutningsbara med varandra via ett anslutningsparti (9) vid en första ände (11) hos respektive hylskropp (5, 6), varvid motstående respektive hylskropp (5, 6) andra ände (13) är försedd med låsorgan
10 (15, 16) för fasthållning av bärorganen (2, 3), **kännetecknat av** att låsorganet (15, 16) hos åtminstone den ena hylskroppen (5, 6) i ett arbetsläge åstadkommer en axiell låsning av det genom hylskroppen (5, 6) löpande bärorganet (2, 3) via en inom området för den andra änden (13) hos hylskroppen (5, 6) på bärorganet (2, 3) åstadkommen stoppdelen (20).
- 15 2. Förbindelseelement enligt krav 1, **kännetecknat av** att stoppdelen (20) är en på bärorganet (2, 3) åstadkommen stukning, vilken uppvisar en diameter som är större än bärorganets (2, 3) diameter.
3. Förbindelseelement enligt krav 1 eller 2, **kännetecknat av** att det genomgående
20 hålet (7) är utformat stegformigt med en första ansats (26), mot vilken stoppdelen (20) stödjer sig.
4. Förbindelseelement enligt krav 3, **kännetecknat av** att den första ansatsen (26) har en avfasning (25) mot vilken stoppdelen (20) stödjer sig.
- 25 5. Förbindelseelement enligt krav 1 eller 2, **kännetecknat av** att låsorganet (15, 16) innefattar åtminstone två hylsdelar (17, 18) som i arbetsläget formar en stopphylsa (22) som bildar en andra ansats (26'), mot vilken stoppdelen (20) stöder sig.

6. Förbindelseelement enligt krav 5, **kännetecknat av** att den andra ansatsen (26') är bildad inuti stopphylsan (22).
7. Förbindelseelement enligt något av föregående krav, **kännetecknat av** att hylskroppens (5, 6) första anslutningsparti (9) innefattar medel (25) för anslutning av hylskroppen (5, 6) till en mellandel (27).
8. Förbindelseelement enligt något av föregående krav, **kännetecknat av** att ett urtag (29) hos hylskroppen (5, 6) vid arbetsläget är i linje med en, sett i hylskroppens (5, 6) och mellandelens (27) längdriktning, fixeringsenhet (31) och närslutande hylskroppen (5, 6), varvid fixeringsenheten (31) är fixerbart anordnat vid mellandelen (27), och ett utskjutande organ (33) hos fixeringsenheten (31) upptas av nämnda urtag (29), så att hylskroppen (5, 6) kan låsas vridfast vid mellandelen (27).
9. Förbindelseelement enligt krav 8, **kännetecknat av** att det utskjutande organet (33) hos fixeringsenheten (31) kan vara frigjort inställt för att icke upptas av nämnda urtag (29), vilket kan medge en frigörelse av hylskroppen (5, 6) från mellandelen (27).
10. Förbindelseelement enligt något av föregående krav, **kännetecknat av** att den åtminstone ena hylskroppens (5, 6) anslutningsparti (10) låses vridfast med hjälp av en låspinne (35), genomförbar genom ett hål (36) genom hylskroppen (5, 6) och mellandelen (27).
11. Förfarande att anbringa bärorgan (2, 3) vid en byggnadskonstruktion medelst ett förbindelseelement (1) enligt något av föregående krav, **kännetecknat av** stegen: Genomföring av en draglina (2) genom ett kabelrör (56) tillsammans med förbindelseelementet (1) så att förbindelseelementet (1) hamnar vid ett område för ett första fundament (54); anslutning av en spännlina (3) till det vid draglinan (2)

5 kopplade förbindelseelementet (1); genomföring av spännlinan (3) i motsatt riktning genom kabelröret (56) med hjälp av draglinan (2) och det ihopkopplade förbindelseelementet (1) så att förbindelseelementet (1) hamnar vid ett område för ett andra fundament (52); fastsättning av spännlinan (3) vid det första respektive
5 andra fundamentet (54, 52); bortkoppling av förbindelseelementet (1) från spännlinan (3).

12. Förfarande enligt krav 11, **kännetecknat av** stegen: påförning av åtminstone den ena hylskroppen (5, 6) över en respektive bärorgan (2, 3) åstadkommen stoppdelen
10 (20); anbringande av åtminstone två hylsdelar (17, 18) omkring respektive bärorgan (2, 3); dragning av respektive bärorgan (2, 3) så att stoppdelen (20, 21) anligger mot hylsdelarna (17, 18), vilka hylsdelar (17, 18) i arbetsläget stödjer sig mot en invändig ansats (26) hos det genomgående hålet (7) under det att stoppdelen (20, 21) stödjer sig mot hylsdelarna (17, 18) för att åstadkomma en axiell låsning av
15 linänden (2, 3); och anslutning av den åtminstone ena hylskroppen (5, 6) till en mellandel (30).

13. Förfarande enligt krav 12, **kännetecknat av** de vidare stegen: låsning av åtminstone den ena hylskroppen (6) vridfast till mellandelen (27) med hjälp av en
20 fixeringsenhet (31) anordnad vid mellandelen (27), vilken fixeringsenhet (31) har ett utskjutande organ (33), som under ihopkopplingen är frigjort inställt, fram till dess att ett urtag (29) hos hylskroppen (6) hamnar i linje med, sett i hylskroppens (6) respektive mellandelens (30) längdriktning, fixeringsenheten (31) och närslutande denna, då fixeringsenheten (31) med sitt utskjutande organ (33) bringas
25 i ingrepp i nämnda urtag (29).

14. Förfarande enligt krav 13, **kännetecknat av** de vidare stegen: låsning av åtminstone den ena hylskroppen (5, 6) vridfast till mellandelen (27) medelst en låspinne (35).

Sammandrag

Förbindelseelement för skarvning av två dragkrafter upptagande bärorgan (2, 3), vilket
5 förbindelseelement (1) innefattar åtminstone en första och en andra hylskropp (5, 6)
med ett genomgående hål (7) för upptagande av respektive bärorgan (2, 3), vilka
hylskroppar (5, 6) är anslutningsbara med varandra via ett anslutningsparti (9) vid en
första ände (11) hos respektive hylskropp (5, 6), varvid motstående respektive
hylskropp (5, 6) andra ände (13) är försedd med låsorgan (15, 16) för fasthållning av
10 bärorganen (2, 3). Låsorganet (15, 16) hos åtminstone den ena hylskroppen (5, 6)
åstadkommer i ett arbetsläge en axiell låsning av det genom hylskroppen (5, 6) löpande
bärorganet (2, 3) via en inom området för den andra änden (13) hos hylskroppen (5, 6)
på bärorganet (2, 3) åstadkommen stoppdelen (20).

15

(Fig. 4)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
12 April 2001 (12.04.2001)

PCT

(10) International Publication Number
WO 01/25651 A1

(51) International Patent Classification⁷: F16G 11/08 // 11/12

(21) International Application Number: PCT/SE00/01927

(22) International Filing Date: 5 October 2000 (05.10.2000)

(25) Filing Language: Swedish

(26) Publication Language: English

(30) Priority Data:
9903585-9 5 October 1999 (05.10.1999) SE

(71) Applicant (for all designated States except US): INTER-
NORDISK SPÄNNARMERING AB [SE/SE]; S-169 83
Stockholm (SE).

(72) Inventor; and

(75) Inventor/Applicant (for US only): NILSSON, Ivar
[SE/SE]; Fänkolsgränd 30, S-182 45 Enebyberg (SE).

(74) Agents: PETRÉ, D. et al.; Albihns Patentbyrå Stockholm
AB, P.O. Box 5581, S-114 85 Stockholm (SE).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

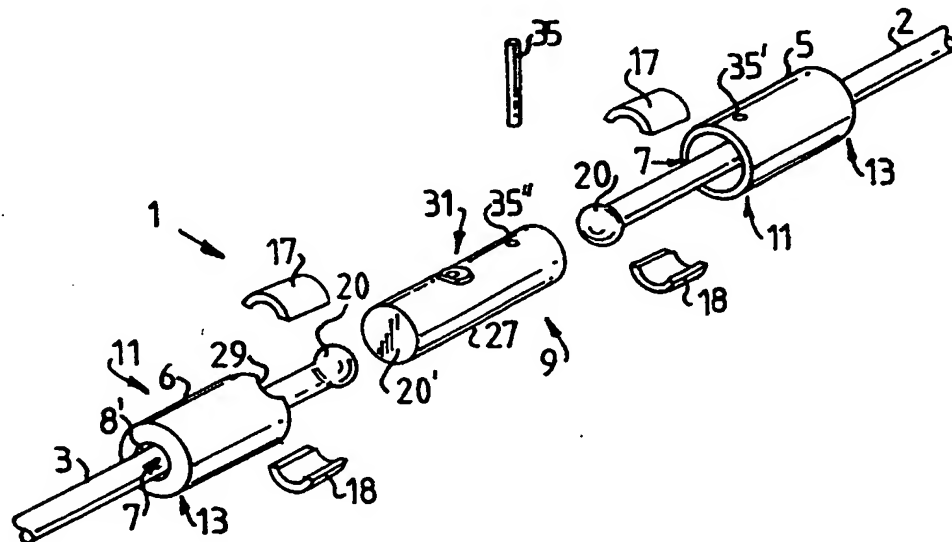
(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

— With international search report.

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CONNECTING DEVICE



(57) Abstract: Connecting element for joining two support members (2, 3) absorbing tensile forces, which connecting element (1) comprises at least a first and a second casing body (5, 6) with a through-hole (7) for receiving the respective support members (2, 3), which casing bodies (5, 6) can be joined together by way of a joining section (9) at a first end (11) of each casing body (5, 6), the opposing second end (13) of each casing body (5, 6) being provided with locking members (15, 16) for holding the support members (2, 3) fast. In a working position the locking member (15, 16) of at least one casing body (5, 6) produces an axial locking of the support member (2, 3) running through the casing body (5, 6) by way of a stop part (20) created on the support member (2, 3) within the area of the second end (13) of the casing body (5, 6).

WO 01/25651 A1

Connecting device

The present invention relates to a connecting element for joining two support members absorbing tensile forces, which connecting element comprises at least
5 a first and a second casing body with a through-hole for receiving the respective support members, which casing bodies can be joined together by way of a joining section at a first end of each casing body, the opposing second end of each casing body being provided with locking members for holding the support members fast.

10

The invention has applications in the construction industry but is not confined to this. Connecting elements, or so-called wire locks, are used for joining support members, such as wire cores in bracing wires, together. Joining can be done during the actual process of assembling a cable consisting of a number of
15 such bracing wires, where tightening of each bracing wire is done separately.

When the wire is tensioned with the required force, the wire can be permanently locked by means of a wedge arrangement against a foundation on a structural part that is to be braced. The connecting element can then be
20 removed from the tensioned wire and fixed to a new wire for drawing.

Cables are used primarily for anchoring various structural parts to one another, such as structural parts in bridges, masts, buildings etc. These cables may be used on the one hand for staying once the structural parts are assembled, and on
25 the other during actual building of the structure. Cables comprising such support members, such as wires, may be used in bridge structures such as suspension bridges, cable-stayed bridges etc.

Known wire locks generally suffer from the disadvantage that they are
30 awkward to handle and take a long time to assemble and dismantle, which

results in high costs. They also have a tendency to come unscrewed and/or to nip the wire core, which makes dismantling of the casing body more difficult. Nipping of the various parts in known wire locks furthermore means that they sit so tight fast after drawing of the wire that the devices must be scrapped,
5 which results in high costs and unnecessarily high material consumption.

Known systems suffer therefore from lack of flexibility, primarily when dismantling, since these design constructions often nip the wire. In some embodiments, the designs according to the prior art have wedges, which cause
10 the problem described above. Wedges are commonly encountered in prestressed concrete fittings. The wedges in the design according to the prior art also have the capacity to go askew in the casing part through which the wire runs, which further complicates handling and makes this unnecessarily expensive.

15 Nor can the wire be rotatably connected to the design construction according to the prior art. This means that unnecessary torque acts on the connecting element, with the risk of the latter coming unscrewed.

20 The object of the invention is to produce a connecting element, which produces axial locking of the support member, whilst the latter is free to rotate in the connecting element.

Another object of the invention is to produce a connecting element, which can
25 be locked in its working position, that is to say in the position in which drawing of a bracing wire may take place, for example.

The connecting element must also have as few projecting parts as possible so that, for example, a wire cannot catch in these during the actual construction
30 work.

The connecting element must furthermore offer good flexibility, permit controlled assembly and dismantling and provide safe use for construction personnel when, for example, fitting and detaching a draw wire from a bracing wire, such as are commonly used, for example, in the construction of a bridge, structure etc. The draw wire may be a wire of the same material and dimension as the wire core of the bracing wire that is to be drawn, but may also be of some other material and with another dimension. The draw wire may thus be used in a recurrent operation when drawing a number of bracing wires.

10

This is achieved by a connecting element of the aforementioned type, in which in a working position the locking member of at least one casing body produces an axial locking of the support member running through the casing body by way of a stop part created on the support member within the area of the second end of the casing body.

15

Further solutions to the object of the invention and characteristics of the invention are specified in the other claims.

20 The invention means that the risk of fracture markings on the wire core is reduced, since the connecting element according to the invention permits rotation of the wire.

25 The invention means that a connecting element has been produced that can be quickly and easily locked in the working position and prevents this coming unscrewed, which is undesirable.

Such a connecting element also reduces the number of parts significantly compared to the prior art, which provides greater operating reliability. Because 30 the wire core or the connecting element is free to rotate, undesirable stresses in

the wire or torsional forces acting on the draw wire or the bracing wire are avoided. Nor do any torsional forces occur that might cause the connecting element to come unscrewed.

- 5 The object is furthermore to produce a connecting element that can be rapidly fitted to and detached from a bracing wire during the construction of a structure, in order to thereby save construction costs.

10 This is achieved by a method of fitting support members to a building construction by means of the connecting element of aforementioned type, which method involves passing the draw wire through a cable duct together with the connecting element so that the connecting element ends up in an area of a first foundation, connecting a bracing wire to the connecting element coupled to the draw wire, passing the bracing wire through the cable duct in the
15 opposite direction by means of the draw wire and the assembled connecting element so that the connecting element ends up in an area of a second foundation, fixing the bracing wire to the first or second foundation respectively, and detaching the connecting element from the bracing wire.


- 20 Such a method provides a quick and simple way of applying a support member, such as a bracing wire, to a construction, such as a cable-stayed bridge.

The invention will be described in more detail in the form of examples of embodiments with reference to figures attached, in which

25

Figure 1 shows a diagrammatic perspective view of a connecting element according to a first embodiment of the invention,

Figure 2 shows a diagrammatic side view of a connecting element according
30 to the first embodiment of the invention in a dismantled state,

- 
- Figure 3 shows a diagrammatic cross section of a part of the connecting element according to the first embodiment of the invention,
- 5 Figure 4 shows a diagrammatic perspective view of a connecting element according to a second embodiment of the invention,
- Figure 5 shows a diagrammatic side view of a connecting element according to the second embodiment of the invention in a dismantled state,
- 10 Figure 6 shows a diagrammatic side view of the connecting element according to the second embodiment in a fitted state,
- Figure 7 shows a diagrammatic side view of the invention shown in figure 6 in an unassembled state,
- 15 Figure 8 shows a diagram of an example of a fixing unit in figures 6 and 7, and
- 20 Figure 9 shows a diagram of the connecting element used in the construction of a cable-stayed bridge.

The term "working position" is taken to mean the condition in which the joint casing is fitted and locked between two wire ends. Figure 1 shows a connecting element 1 according to a first embodiment of the invention in a dismantled condition. The connecting element 1 in figure 1 is intended to connect a draw wire 2 to a bracing wire 3. The connecting element 1 comprises a first and a second casing body 5 and 6, of which the first casing body 5 is intended to be coupled to the draw wire 2, which during construction is intended to draw a number of bracing wires 3 one at a time into a cable duct

25

30

(not shown in figure 1, shown as 56 in figure 9). When the draw wire 2 has been passed through the first casing body 5 the end of the draw wire is upset to form a boss 20. The boss 20 can thus be made of the same material as the bracing wire 3. This has the advantage that there does not need to be any further material on the construction site in order to produce the boss 20. Upsetting is advantageously performed with a rounded shape. A stop part can thereby be produced by simple means.

A joint sleeve 27 provided with thread 25 (only partially shown in figure 1) is then screwed on to a first end 11 of the casing body 6 so that the boss 20 bears against a shoulder 26 (see figure 3) situated inside the casing body and so that a locking pin 35 can be hammered down through a bore 35' and corresponding hole 35'' in the joint sleeve 27. The casing body 5, which is intended for a more permanent fixing, that is to say the casing body 5 that holds the draw wire 2 etc., can thereby be provided, for example, with a more permanent fixing arrangement of the casing body 5 to the joint sleeve 27. In this way the draw wire 2 is locked to the connecting element 1 by simple means. This results in reliable handling and easy assembly and dismantling.

The casing bodies 5 and 6 are provided with a through-hole 7 to receive the draw wire 2 and the bracing wire 3. The said hole 7 extends in the longitudinal direction of the connecting element 1. By incorporating a bore 8, which has a smaller diameter than the diameter of the boss 20, in a second end 13 of each casing body 5 and 6, the boss 20 can rest against a shoulder 26 situated inside the casing body (see figure 3). Thus in the working position the boss 20 of the bracing wire 3 bears, freely rotatable, against the shoulder 26 on the casing body 6, producing an axial locking of the bracing wire. The shoulder 26 is formed so that the inside diameter of the casing body 6 can accommodate the boss 20.

The arrangement described also applies to the coupling of the draw wire 2 to the casing body 5.

The casing body 6 of the connecting element 1 is also arranged at the corresponding end of the joint sleeve 27 for connection by means of a thread 25 on the joint sleeve 27 (the thread 25 is only partially shown). A corresponding thread 25' is produced in the casing body 6 (see figure 2). Two casing bodies 5 and 6 can thereby be connected to one another, of which one casing body 5 is coupled to the draw wire 2 and the other casing body 6 holds a bracing wire 3 that is to be drawn. One end 20' of the joint sleeve 27 preferably bears against the boss 20 when the joint sleeve 27 is connected to the casing body 6, which means that the boss 20 ends up in a position against the first shoulder 26 before drawing of the bracing wire 3.

When fitting the casing body 6 that holds the bracing wire 3, a recess 29 ends up against the head 33 of a lock bolt 31. This locking arrangement and the method of locking this will be further described below.

Figure 2 shows a diagrammatic side view of the main parts of a connecting element 1 according to the first embodiment. The first casing body 5 therefore comprises the through-hole 7, which is of stepped design with a first shoulder 26, against which the boss (shown in figure 1) can rest. The said shoulder 26 is advantageously bevelled with a bevel 25 in order to provide support against the round shape of the boss 20 and so that the shoulder 26 does not cut into the boss 20. At the first end 11 of the casing body 6 there is a joining section 9. An inside thread 25' is here produced in the through-hole 7 in order to receive the thread 25 of the joint sleeve 27. A tapped hole 31' is produced in the joint sleeve 27 for receiving a lock bolt 31 (not shown in figure 2, see figures 1, 6, 7 and 8). Figure 2 also shows the bore 35' and the corresponding hole 35'' for receiving the locking pin 35 (see figure 1).



Figure 3 shows a part of the connecting element 1 according to the first embodiment. Figure 3 shows how the bracing wire 3 with its boss 20 is accommodated by the shoulder 26 with its bevel 25. In order to remove the casing body 6 from the bracing wire 3 the wire can be severed in the vicinity of the connecting element 1 and the wire end with the boss 20 can then be removed. When making a new joint a new wire end can now be introduced through the bore 8 and the hole 7 to be then upset with the aid of an upsetting machine.

10

Figures 4 and 5 show a second embodiment of the invention, in which the connecting element 1 is dismantled. The reference numbers shown in these figures largely correspond to those shown in figure 1. The difference compared to the first embodiment lies, among other things, in the fact that the bore 8' has a larger diameter than the boss 20. From this two projections 17 and 18 have been produced in order to form a support between the shoulder 26 of each casing body 5 and 6 and each boss 20 respectively. In a working position the said projections 17 and 18 together form a stop casing 22. The said stop casing 22 forms a second shoulder 26' (see figure 6), against which the boss 20 rests.

15 In figure 4 the casing parts that constitute the projections 17 and 18 are formed without any shoulder on the inside. That is to say, in the working position the boss 20 rests against one end of the stop casing 22 formed. The second shoulder 26' may advantageously be formed inside the stop casing 22 (see figure 5). In this way, when coupling the bracing wire 3 to the connecting
20 element 1, the boss 20 can be guided in with the aid of a substantially cylindrical flange area 22', formed all round the second shoulder 26', to the stop casing 22 and thus finish up correctly at the second shoulder 26'. This guide means that the boss 20 is largely centred in the casing body 6, without impinging on or being acted upon by the inner surface of the casing body 6.

25
30 Figure 5 shows a diagrammatic side view of the connecting element 1 in figure

4 and its main parts. Here one of the projections 17 has been clearly shown in order to illustrate the second shoulder 26', which constitutes a support for the boss 20.

5 A harder material may advantageously be used for the casing parts 17 and 18 than for the casing bodies 5 and 6. This harder material is often more expensive. By making the casing parts 17 and 18 replaceable, the material cost can be reduced. This is because in the event of any wear it is only necessary to replace the casing parts 17 and 18. There are advantageously two casing parts
10 or projections, although there may be more. They are formed so that when detaching from the bracing wire 3 they allow the bracing wire 3 with its boss 20 to be taken out of the casing body 6 without having to remove the boss 20 or sever the wire. This is facilitated by the fact that the bore 8' has a larger diameter than the boss 20.

15

Figure 6 shows a diagram of a connecting element 1 according to the second embodiment fitted to a bracing wire 3 and a draw wire 2. The reference numbers occurring in figures 6 and 7 correspond to the reference numbers described and shown earlier, but it must be noted that the connecting element is
20 viewed from a different direction to that shown in figures 3-5. Figure 6 clearly shows how the bracing wire 3 and the draw wire 2 bear against respective projections 17 and 18 (only 17 is shown in figures 6 and 7, because 18 is obscured). The projections 17 and 18 in turn bear against a shoulder 24.

25 In the working position the bosses 20 produced at each wire end bear, freely rotatable, against the casing body 5 and 6 by way of the projections 17 and 18, producing an axial locking of each wire end. The number of parts has thus been substantially reduced compared to the prior art, which gives greater operating reliability. Because the wire core or the connecting element is free to
30 rotate, undesirable stresses in the wire are avoided. Stresses caused by known

design constructions currently on the market have resulted in accidents when tensioning or drawing wires. The boss 20 is produced after or before the bracing wire 3 is passed through the bore 8' in the casing body 6. The bore 8' therefore has a larger diameter than the boss 20.

5

In this context two casing parts, for example, formed as projections, can ensure that fitting the casing body to and detaching it from the bracing wire 3 can be done without needing to sever the wire. Consequently the boss 20 does not need to be removed when dismantling, which reduces the working time when
10 drawing a cable, which in itself may comprise up to 80 wires. Likewise the two casing parts 17 and 18, against which the boss 20 bears, mean on the one hand that the core of the wire can rotate due to the fact that the boss 20 has the facility to rotate in relation to the second shoulder 26' of the stop casing 22 formed from the projections 17 and 18, and on the other that the actual stop
15 casing 22 can rotate in the casing body 6. This results in minimal wear of the device according to the invention, since the friction is distributed over numerous surfaces in the connecting element. The connecting element 1 according to the invention comprises similar locking members both for the wire that is to be tensioned and the draw wire itself. This provides further scope for
20 the wire to rotate and further reduces wear.

The casing body 6 is locked to the joint sleeve 27 by means of a lock bolt 31 having a bevelled head 33. The bevel is preferably a plane 32. In the assembled position the plane 32 is turned away from the casing body 6 so that
25 the non-bevelled section of the head 33 is accommodated by the recess 29 for locking. In this way the casing body 6 can be locked to the joint sleeve 27, which prevents the casing body 6 being accidentally released from the joint sleeve 27 in an undesirable way. The head 33 is accommodated by the recess 29 in the casing body 6 to such an extent that no part of the projecting member
30 protrudes beyond the outline of the casing body. This prevents wires or other

objects catching in the connecting element. The connecting element also has rounded corners h, in order to allow smooth transport thereof from one position to another. Since the head 33 is easily accommodated by the recess 29 and the device can be easily and swiftly handled, much time can be saved. At the same time safety on the construction site is maintained since a double safeguard to prevent the device coming unscrewed has been created. The freely rotatable connecting element 1 means that the element rotates over each boss 20, thus eliminating torsional forces acting on the joining section 9, whilst the connection is secured by means of the said lock bolt 31.

To release the casing body 6 from the joint sleeve 27, the lock bolt 31 is turned approximately one half turn, so that the plane 32 is turned towards the casing body 6, as shown in figure 7. The arrow P shows the turning direction of the lock bolt 31 illustrated in figures 6 and 7.

Figure 7 shows the connecting element 1 according to the invention in a position in which the casing body 6 can be released from the joint sleeve 27. The casing body 6 can thereby be released from the joint sleeve 27 in a controlled way, which in turn means that the wire with the boss 20 can easily be removed from the casing body 6. Turning the lock bolt 31 can be done with the aid of a tool, such as a hexagon socket key.

Figure 8 shows an example of the lock bolt 31 according to the invention. The plane 32 is advantageously produced so that its surface is tangent to the outer surface of the bolt body, that is to say the area for the thread G. The thread G corresponds to the thread g produced in the joint sleeve 27 (see figures 2 and 5). The recess u for the hexagon socket key is produced in the head 33.

Figure 9 shows an example of the sphere of application, in which the connecting element 1 according to the invention is used to advantage. The

terms "upper", "lower" etc. refer to the usual orientation on structures etc. such as upwards, downwards and so on. For the sake of clarity, in figure 9 the proportions do not correspond to the actual ones. In the drawing the main parts of a cable-stayed bridge under construction are shown diagrammatically.

5 Figure 9 may be explained below in conjunction with figure 5. By means of a push machine M a draw wire 2 with the connecting element 1 (enlarged for elucidation of the method) is displaced from a position on an upper foundation 52 on a pylon 53 to a lower foundation 54 on a bridge floor 55 in order to bring up a bracing wire 3. The pylon 53 stands on the bed rock b. A hoist 60 for
10 transporting persons and material is arranged on the pylon 53. The draw wire 2 is pushed together with the connecting element 1 through a cable duct 56 to the lower foundation 54, where a wire reel 57 with bracing wire 3 is located. At the end of the bracing wire 3 a boss 20 (not shown in figure 9) is produced by means of an upsetting machine (not shown). According to the first embodiment
15 the boss 20 is upset after the casing body 6 has been applied to the wire. According to the second embodiment the boss 20 can preferably be upset before the casing body 6 is applied to the wire.

The end of the bracing wire 3 is passed through the casing body 6. Casing
20 parts (not shown in figure 9, but shown by reference numbers 17 and 18 in figure 4) are placed around the end of the bracing wire 3 and inside the casing body 6. The bracing wire 3 is drawn back so that the boss 20 bears against the projections 17 and 18 in the casing body 6. The intermediate part, for example a joint sleeve 27 provided with thread 25, is screwed into the casing body 6 so
25 that the end 20' of the joint sleeve 27 presses the boss 20 fully in against the casing parts 17 and 18 and the casing body 6. In this way the boss 20 can be guided into a position against the shoulder when assembling, which means that the projections 17 and 18 interact before actual drawing of the bracing wire 3 takes place. At this stage the head 33 of the lock bolt 31 is turned with its
30 plane 32 towards the casing body 6, so that the casing body 6 can be turned

into a position in which the recess 29 aligns with the lock bolt 31 (see figure 7). In this position the lock bolt is preferably tightened by 180 degrees or at least so far that the plane 32 ends up in the area of the recess 29. This position is shown in figure 6. After this tightening the lock bolt 31 is tightened to its
5 lowest position using the requisite force and locks the casing body 6 to the joint sleeve 27. The second casing body 5 is locked to the joint sleeve 27 by means of the locking pin 35.

The push machine M, which may also preferably be equipped with drawing
10 drive members, then draws the bracing wire 3 back by means of the draw wire 2 and the connecting element 1 through the cable duct 56 to the area of the upper foundation 52. The bracing wire 3 is then fixed to the lower foundation in the conventional way and cut off below this. The bracing wire 51 now situated in the cable duct 56 is then drawn with the requisite force and fixed to
15 the upper foundation 52.


The lock bolt 31 is then slackened to a position as shown in figure 7. That is to say the lock bolt 31 is turned through approximately 180 degrees to a position in which the plane 32 of the head 33 lies opposite the casing body 5 largely
20 perpendicular to the longitudinal direction of the casing body. The casing body 6 can then be screwed off the joint sleeve 27. The end of the bracing wire 3 is also pushed back so that the boss 20 is exposed together with the casing parts 17 and 18 (shown in figure 3), these then being removed, which means that the bracing wire 3 with its boss 20 can be brought out of the casing body 6. Parts
25 of the connecting element 1 can be re-assembled (the connecting element is still fitted to the draw wire 51) and again pushed down by means of the draw wire 2 to the lower foundation 54 to be again coupled to a new end of the bracing wire 3.

The bracing wire 3 can naturally be fixed to the upper foundation 52 first and then tensioned from the bridge floor 55 below at the lower foundation 54 and then fixed there. The connecting element 1 together with the draw wire 3 can be passed to the lower foundation 54 whilst actual fixing of the bracing wire is
5 in progress.


This downward and upward displacement of the draw wire with the connecting element described above can be performed eighty times in a cable duct 56, since a cable duct may generally contain up to this number of bracing wires. A
10 cable-stayed bridge may in turn have up to a hundred cable ducts. By means of the invention much time can therefore be saved when assembling the said bracing wires. In addition the invention is extremely reliable in operation and is not complicated to handle.

Claims

1. Connecting element for joining two support members (2, 3) absorbing tensile forces, which connecting element (1) comprises at least a first and a second casing body (5, 6) with a through-hole (7) for receiving the respective support members (2, 3), which casing bodies (5, 6) can be joined together by way of a joining section (9) at a first end (11) of each casing body (5, 6), the opposing second end (13) of each casing body (5, 6) being provided with locking members (15, 16) for holding the support members (2, 3) fast, characterized in that in a working position the locking member (15, 16) of at least one casing body (5, 6) produces an axial locking of the support member (2, 3) running through the casing body (5, 6) by way of a stop part (20) created on the support member (2, 3) within the area of the second end (13) of the casing body (5, 6).
2. Connecting element according to claim 1, characterized in that the stop part (20) is an upset part produced on the support member (2, 3) and having a diameter larger than the diameter of the support member (2, 3).
3. Connecting element according to claim 1 or 2, characterized in that the through-hole (7) is of stepped design with a first shoulder (26), against which the stop part (20) rests.
4. Connecting element according to claim 3, characterized in that the first shoulder (26) has a bevel (25) against which the stop part (20) rests.
5. Connecting element according to claim 1 or 2, characterized in that the locking member (15, 16) comprises at last two casing parts (17, 18) which in the working position form a stop casing (22), which forms a second shoulder (26'), against which the stop part (20) rests.

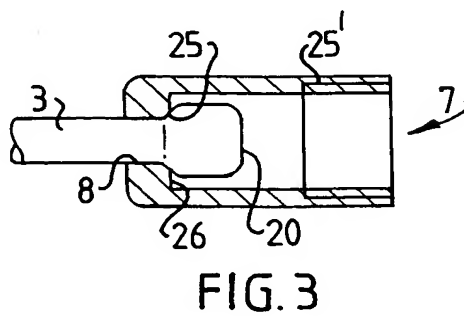
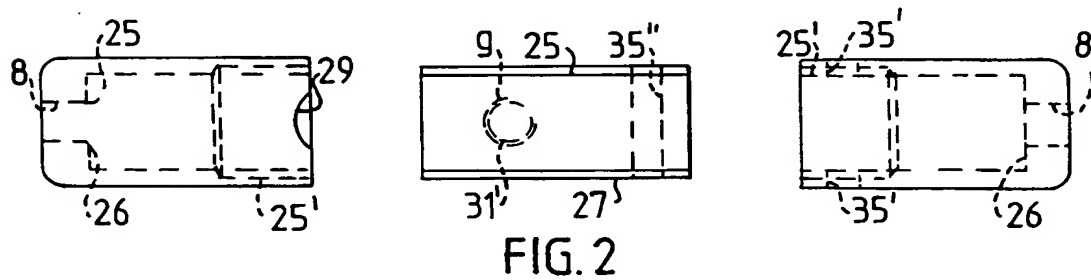
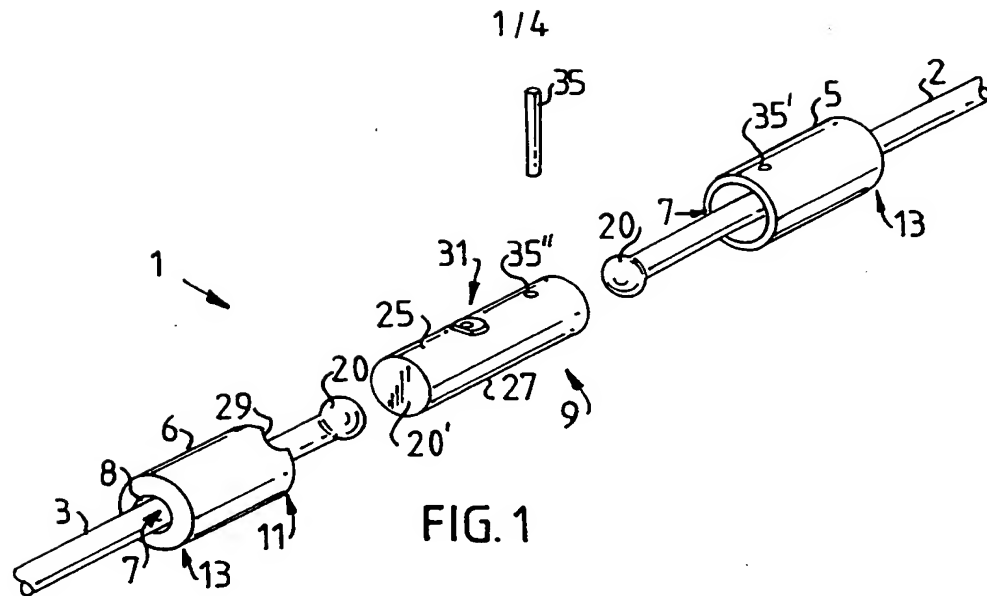
- 
6. Connecting element according to claim 5, **characterized in that** the second shoulder (26') is formed inside the stop casing (22).
- 5 7. Connecting element according to any of the preceding claims, **characterized in that** the first joining section (9) of the casing body (5, 6) comprises means (25) for joining the casing body (5, 6) to an intermediate part (27).
- 10 8. Connecting element according to any of the preceding claims, **characterized in that** in a working position a recess (29) in the casing (5, 6), viewed in the longitudinal direction of the casing body (5, 6) and the intermediate part (27), aligns with a fixing unit (31) and encloses the casing body (5, 6), the fixing unit (31) being arranged so that it can be
15 fixed to the intermediate part (27) , and a projecting member (33) of the fixing unit (31) being accommodated by the said recess (29), so that the casing body (5, 6) can be torsionally locked to the intermediate part (27).
- 20 9. Connecting element according to claim 8, **characterized in that** the projecting member (33) of the fixing unit (31) can be released so that it is not accommodated by the said recess (29), thereby allowing the casing body (5, 6) to be released from the intermediate part (27).
- 25 10. Connecting element according to any of the preceding claims, **characterized in that** the joining section (10) of at least one casing body (5, 6) is torsionally locked by means of a locking pin (35), which can be inserted through a hole (36) through the casing body (5, 6) and the intermediate part (27).

11. Method for fitting a support member (2, 3) to a building construction by means of a connecting element (1) according to any of the preceding claims, **characterized by the following stages:** passing of a draw wire (2) through a cable duct (56) together with the connecting element (1) so that the connecting element (1) finishes up in an area of a first foundation (54); connection of a bracing wire (3) to the connecting element (1) coupled to the draw wire (2); passing of the bracing wire (3) through the cable duct (56) in the opposite direction by means of the draw wire (2) and the coupled connecting element (1), so that the connecting element (1) finishes up in an area of a second foundation (52); fastening of the bracing wire (3) to the first or second foundation (54, 52); detachment of the connecting element (1) from the bracing wire (3).
12. Method according to claim 11, **characterized by the following stages:** application of at least one casing body (5, 6) over a stop part (20) produced on each support member (2, 3); fitting of at least two casing parts (17, 18) around each support member (2, 3); drawing of each support member (2, 3) so that the stop part (20, 21) bears against the casing parts (17, 18), which casing parts (17, 18) in the working position rest against an internal shoulder (26) in the through-hole (7) whilst the stop part (20, 21) rests against the casing parts (17, 18) in order to produce an axial locking of the wire ends (2, 3); and joining of at least one casing body (5, 6) to an intermediate part (30).
13. Method according to claim 12, **characterized by the further stages:** torsional locking of at least one casing body (6) to the intermediate part (27) by means of a fixing unit (31) arranged on the intermediate part (27), which fixing unit (31) has a projecting member (33), which during coupling together is released until a recess (29) in the casing body (6), viewed in the longitudinal direction of the casing body (6) and the



intermediate part (30), aligns with the fixing unit (31) and encloses the latter, at which time the fixing unit (31) with its projecting member (33) is brought into engagement with the said recess (29).

- 5 14. Method according to claim 13, characterized by the further stages:
torsional locking of at least one casing body (5, 6) to the intermediate part
(27) by means of a locking pin (35).



314

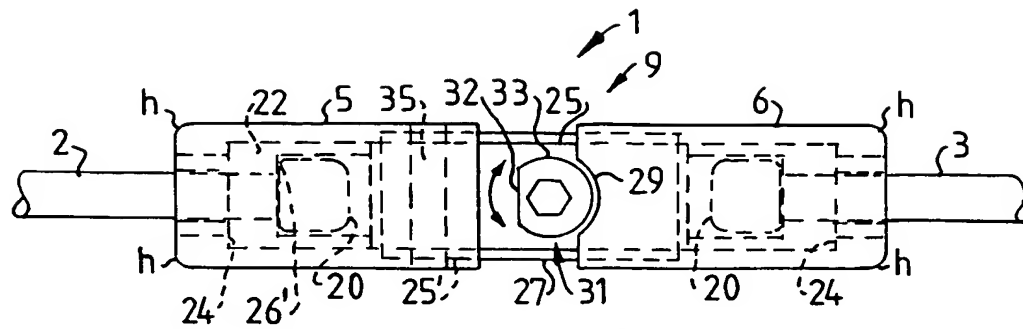


FIG. 6

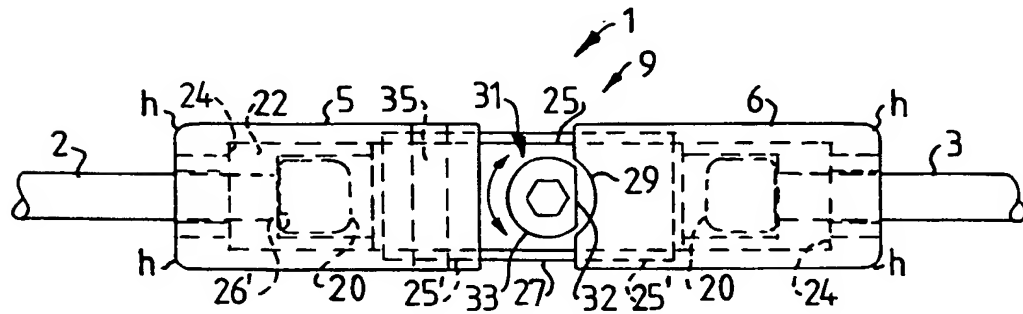


FIG. 7

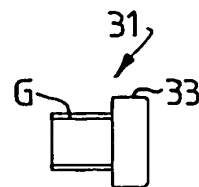
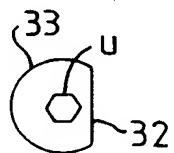


FIG. 8

1
INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 00/01927

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: F16G 11/08 // F 16 G 11/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B21F, E04G, F16B, F16G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 960436 A (OSKAR BIEGEL G.M.B.H.), 10 June 1964 (10.06.64), page 2, line 13 - line 86, figures 4, 11-16, pos. 12-15,19,21 --	1-8
X	NO 158402 B (T. JOHANSEN), 30 June 1988 (30.06.88), page 3, line 14 - line 32, figure 1, pos. 1,5,8 --	1-7
X	EP 0228165 A2 (MEITHO DENKI KOHJI KABUSHIKI KAISHA), 8 July 1987 (08.07.87), column 2, line 47 - column 3, line 55, figure 1, pos. 10,20, 30,40 --	1-8

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

17 January 2000

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. +46 8 666 02 86

Date of mailing of the international search report

22 -01- 2001

Authorized officer

Sune Söderling/MN
Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/01927

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 1193906 A (NORCO INC.), 3 June 1970 (03.06.70), page 2, line 7 - line 115, figures 1-8, pos. 12,18,20,56,58 -----	1-8

INTERNATIONAL SEARCH REPORT
Information on patent family members

27/12/00

International application No.
PCT/SE 00/01927

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
GB	960436	A	10/06/64	NONE		

NO	158402	B	30/06/88	DE	3403612 A	30/08/84
				DK	66683 A	17/08/84
				DK	151921 B,C	18/01/88
				FI	840575 A	17/08/84
				NO	840228 A	17/08/84
				SE	460453 B,C	16/10/89
				SE	8400576 A	17/08/84

EP	0228165	A2	08/07/87	SE	0228165 T3	
				DE	3674894 D	00/00/00
				JP	62147904 A	01/07/87
				US	4733442 A	29/03/88

GB	1193906	A	03/06/70	DE	1901525 A	30/10/69
				FR	1596250 A	15/06/70
				US	3530548 A	29/09/70
